



Review Article

COVID-19: AN APPLIED INTERVENTION THROUGH AYURVEDA

U.R.Sekhar Namburi<sup>1\*</sup>, Shubhangi Jadhav<sup>2</sup>, Shobhit Kumar<sup>1</sup>, Shrikant Hadole<sup>3</sup>

<sup>1</sup>Research Officer (Ay.), Central Council for Research in Ayurvedic Sciences, New Delhi.

<sup>2</sup>Assistant Professor, Bhausaheb Mulak Ayurved College and Research Hospital, Butibori, Nagpur, Maharashtra.

<sup>3</sup>Assistant Professor, Vijyashree Ayurvedic Medical College & Hospital, Jabalpur, Madhya Pradesh.

ABSTRACT

The world is crippling due to pandemic coronavirus disease (COVID-19) which is caused by severe acute respiratory syndrome Coronavirus (SARS-CoV-2). This situation can be considered under *Janapadodhwamsa* (destructions of states or kingdoms or countries) as mentioned in Ayurveda. Further, COVID-19 infection may be correlated with *Vata-Kaphaja Sannipataja Jwara* (a type of fever mentioned in classical Ayurvedic texts with severe complications and fatality). The article is mainly intended to interpret direct correlation between pandemics and *Janapadodhwamsa*, understanding the concept of COVID-19 and its probable management principles based on ethics of Ayurveda. The main aim of management principles includes correction of the *Vikruta* (contaminated) *Vayu* (air) and *Desha* (place/continent etc.) and improving the strength and immunity for prevention of disease as well as the management of COVID-19 patients by various herbal or herbo-mineral combinations based on the stage/severity of the disease along with follow up of recovered patients to avoid the recurrence.

Considering above comprehensive aspect in management of COVID-19, the role of Ayurveda intervention may be proved more beneficial in asymptomatic, mild and moderate stages. Further, clinical studies on these drugs need to be conducted to produce evidence for safety and efficacy on COVID-19 for wider acceptance and implementation of *Ahara Vidhis*, *Dinacharya* and *Sadvritta* in National Health Policies for improving disease resistance.

**KEYWORDS:** Ayurveda, COVID-19, *Janapadodhwamsa*, *Jwara*, Pandemic, *Rasayana*, *Sadvritta*.

INTRODUCTION

The Coronavirus disease 2019 (COVID-19) is a pandemic, caused by severe acute respiratory syndrome Coronavirus 2 (SARS-CoV-2). The outbreak was first identified in Wuhan, Hubei Province, China, in December 2019. The World Health Organization (WHO) declared the outbreak to be a Public Health Emergency of International Concern on 30<sup>th</sup> January 2020 and later on as a pandemic on 11 March 2020<sup>[1]</sup>. In India, the COVID-19 outbreak has been declared an epidemic and the first case of COVID-19 was reported on 30 January 2020. Total numbers of cases reported in India are 18,601 including 14,759 active cases, 3251 cured/discharged cases, 590 deaths cases and 01 migrated case<sup>[2]</sup> and progressively increase in number of the patients.

In Ayurveda, the natural calamities like epidemics and pandemic diseases are described under *Janapadodhwamsa* (destructions of states or kingdoms or countries) due to vitiation of *Vayu* (air), *Jala* (water), *Desha* (soil or state or continent) and *Kala* (time or climate)<sup>[3]</sup>. Involving the either of these

factors are more lethal from one to another respectively<sup>[4]</sup>. These factors are mainly vitiated due to *Adharma* (sinful acts)<sup>[5]</sup> and the death of large population occurs due to invasion of *Bhutas*<sup>[6]</sup>. The *Janapadodhwamsa* is common cause for manifesting disease to many people with common signs and symptoms<sup>[7]</sup>. In this context, the word '*Marak*' also specified in classics, which means destruction and occurs due to intake of contaminated water and medicines<sup>[8]</sup>. Even in the normal seasons due to sinful acts, *Bhutas*, non-religious acts and breakdown of living culture may lead to destruction of *Desha* (states/ countries). Furthermore, the air may get contaminated due to presence of *Visha* (toxins/ bacteria/ viruses) and may cause diseases like cough, breathlessness, vomiting, common cold, headache and fever irrespective of *Desha* (geographical area), *Dosha* and *Prakruti* (body constitution)<sup>[9]</sup>.

In this context, the concept of *Sansargaja* (contagious) and *Upsragaja* (infectious) diseases<sup>[10]</sup> is emphasized in Ayurveda, which are transmitted

directly from infected person to healthy persons and these diseases may cause epidemic or pandemic. The mode of transmission of these diseases includes physical contact, exhaled air, eating with others in same plate, sharing bed and using other's clothes, ornaments and cosmetic products etc.<sup>[11]</sup>

As per Ayurveda, the COVID-19 pandemic can be understood that it is due to *Vikruti* (Contamination) of *Vayu* and *Desha*. Further, COVID-19 infection may be considered as *Upsargika Roga* (communicable disease), which can be included under *Abhishangaja Jwara* and it is one among four types of *Agantuja Jwara* (fever caused by external factors may be like virus etc.)<sup>[12]</sup>. In progression of the disease, it vitiates the *Doshas* and gets converted to *Nija Vyadhi* (endogenous diseases), it may resemble to *Vata-Kaphaja Sannipataja Jwara* with the symptoms like feeling of cold, cough, anorexia, drowsiness, thirst, burning sensation and pain<sup>[13]</sup>. Further, it may be complicated by symptoms like dyspnea and with high fatality rate<sup>[14]</sup> which occurs in advanced stage of COVID-19.

The coronavirus incubation period ranges from 2–14 days. In humans, it is transmitted directly through infected individual, droplets from coughing or sneezing, or indirectly through touching contaminated objects or surfaces as well as close contact, such as touching or shaking hands<sup>[15]</sup>. Suspected cases should be screened for the virus with nucleic acid amplification tests (NAAT), such as RT-PCR (Reverse Transcriptase Polymerase Chain Reaction) with confirmation by nucleic acid sequencing, if required<sup>[16]</sup>.

In humans, the COVID-19 infection shows the signs and symptoms depending up on the severity of the disease. The patients with uncomplicated (mild) illness usually shows the symptoms of an upper respiratory tract viral infection, including mild fever, cough (dry), sore throat, nasal congestion, malaise, headache, muscle pain, or malaise and patient may have GIT symptoms like diarrhea and vomiting. In complicated illness patients may have various stages of Pneumonia (moderate and severe) and critical (Acute Respiratory Distress Syndrome and sepsis)<sup>[17]</sup>. At present, vaccine, specific drug and treatment is yet to be developed. Therefore, it is need of the hour to make a pragmatic plan through Ayurveda principles for prevention of disease and treatment of infected persons based on the severity/stage of the disease.

#### OBJECTIVES

- To interpret the epidemics/pandemics and *Janapadodhwamsa*
- To understand the concept of COVID-19 in terms of Ayurveda

- To generate guide lines for the management as per the Ayurvedic principles.

#### MATERIALS AND METHODS

All the relevant literatures including classical Ayurvedic texts with their commentaries and electronic data base including Google scholar, PubMed, different government health agencies websites, Google search were searched to collect the relevant data by using the key words- corona virus disease, COVID-19, Ayurveda, *Janapadodhwamsa*, *Aupsargika Roga*, Traditional medicine, WHO, immunity, immune-modulator and *Rasayana* etc.

#### MANAGEMENT PRINCIPLES AND GUIDELINES

In Ayurveda, the main reason of *Janapadodhwamsa* is *Adharma* (sinful or unwholesome acts) and it was mostly due to three factors like *Asatmedriya samyoga* (unwholesome conjunction of sense organs and objects), *Pragyaparadha* (doing errors intentionally) and *Parinama* (consequences). Hence, *Acharya Charaka* has stressed in pandemics more on *Sadvritta* to bring the conjoined balance of three factors. Further, he stated that *Rasayana* and *Panchakarmas* are the main management principles in these conditions. In the contemporary science, the recommended drugs or treatment procedures for COVID-19 are yet to be developed. Therefore, guidelines have been prepared in integrated method with the treatment principles of Ayurveda. The main aim of management principles/Ayurveda intervention includes:

1. Disinfection of the *Vikruta Vayu* and *Desha*.
2. Prevention from the disease in healthy and vulnerable individuals.
3. Ayurveda intervention for COVID-19 patients based on the stage/severity of the disease.
4. Ayurveda intervention for recovered patients and prevention of the recurrence.

#### Disinfection of the *Vikruta Vayu* and *Desha*

In the classics, it was mentioned that change of place and performing the *Homa* (oblation) etc. in the pandemics<sup>[18]</sup>. Hence *Homa* can be indicated for correction of the *Vikruta Vayu* and *Desha*. *Homa* is a spiritual ritual and scientifically can be understood as one type of *Dhupana* (fumigation). In this procedure, the heat and fumes/gases generated by *Dhupana* may sterilize the air. It may prevent spreading of COVID-19 from one person to other person through contaminated air. For this some of the easily available herbs/drugs in *Dashanga Dhupam*<sup>[19]</sup> and also the drugs like *Tulasi* (holy bacilli) and *Haridra* (turmeric) can be used for fumigation as mentioned in Table-1.

**Table 1: Showing the drugs and procedure of Dhupana Karma**

| S.No. | Name of the Drug                            | Procedure   |
|-------|---|---|
| 1     | <i>Nimba</i> (neem)                         | The combination of the all drugs powder by equal parts or any one of the drug powder mixed with few drops of ghee and it is to be sprinkled repeatedly over the fire generated by the cow dung (better to prefer) or coal for at least 5 to 10 minutes in morning as well as evening. |
| 2     | <i>Vacha</i> (sweet flag)                   |   |
| 3     | <i>Sweta Sarshapa</i> (white mustard seeds) |   |

Further, disinfection of the place can be achieved by sprinkling of decoction prepared with *Vidanga* (*Embelia ribes*), *Marich* (*Piper nigrum*) and *Pippali* (*Piper longum*) or *Nimba* (*Azadirachta indica*).<sup>[20]</sup>

#### Prevention from the disease in healthy and vulnerable individuals

The preventive aspect of management aims to maintain health of a healthy individual and improving disease resistance capacity, which are key factors in the management of COVID-19. For achieving this, *Agni* (the energy responsible for metabolism and transformation) and *Bala* (innate/acquired strength and immunity) restoration are important factors. These can be achieved by proper use of *Ahara* (food and its habits), *Vihara* (life styles), and administration of various *Oushadhas*

(medicines), *Rasayanas* (immune-modulators) as well as *Panchakarmas*.

#### Aharam (food habits)

Ayurveda emphasizes that food is one among three supporting pillars of life<sup>[21]</sup> and described it as *Mahabheshajam* (above all medicines), *Ahara* improves vitality, strength, complexion and *Ojas* (immunity)<sup>[22]</sup> and none of the medications can be equivalent to *Ahara*<sup>[23]</sup>. Further, wholesome food is foremost factor for the growth and wellbeing of humans, while unwholesome food is the source of all diseases<sup>[24]</sup>.

It is important to follow principles on wholesome and unwholesome foods<sup>[25]</sup> and *Ahara Vidhi Vidhanas* (dietary guidelines). The important dietary guidelines comprises of consuming warm, unctuous, balanced diet and after digestion of previous meals. The preparation of diet items should be compatible to each other and consume meals at pleasant place with proper serving instruments. The food should not be eaten too fast or too slow. Talking or laughing should be avoided and one should focus on eating with self-analysis<sup>[26]</sup>. These diet guidelines should be followed otherwise the well prepared nutritious food with indicated items may also not fulfill all the requirements of the body. In view of the above, Table-2 is showing guidelines related to the wholesome and unwholesome foods<sup>[27]</sup> according to availability at present time as mentioned in Ayurveda classics and guidelines issued by Ministry of AYUSH, which can be advised to the people during COVID pandemic conditions.

**Table 2: Showing indicated and contra-indicated food items and cooked foods**

| S.No | Type of Food | Wholesome   | Unwholesome  |
|------|--------------|---|--|
| 1.   | Cereals      | Old and unpolished rice, <i>Godhuma</i> (wheat), <i>Yava</i> (barley).  | New Rice   |
| 2.   | Pulses       | <i>Mudga</i> (Green gram), <i>Masura</i> (Lentils), <i>Chanaka</i> (Bengal gram), <i>Aadhaki - Toor dal</i> (Red gram, Pigeon pea).   | <i>Masha</i> (Black gram)  |
| 3.   | Vegetables   | <i>Vastuka</i> (lambs quarter), <i>Tanduliyaka</i> (prickly amaranth), <i>Kushmanda</i> (ash gourd), <i>Patola</i> (pointed gourd), <i>Karvellak</i> (bitter gourd), <i>Alabu</i> (white gourd), <i>Vruntak</i> (brinjal), <i>Koshataki</i> (ridge gourd), <i>Shigru</i> (drum stick) and <i>Palandu</i> (onion). | <i>Sarshapa Shaka</i> (mustard leaf) and Cucumber.                     |
| 4.   | Fruits       | <i>Dadima</i> (Pomegranate), <i>Aamlaki</i> (Indian Gooseberry) and <i>Erandkarkati</i> (Papaya).   | Banana, Chikoo, Pineapple, Custard apple, Guava and other sour fruits. |
| 5.   | Meat         | <i>Chuluki</i> (Gangetic dolphin), <i>Aja mamsa</i> (Goat meat) and <i>Kukkut mamsa</i> (Chicken).  | <i>Go mansa</i> (Cow meat), <i>Kankapota mansa</i> (young dove),       |



|     |   |  |  |
|-----|---|--|--|
|     |   |  | Frog, <i>Chilchim</i> fish, <i>Kumbhir</i> (crocodile) fat, <i>Kakamudga</i> (water fowl) fat, <i>Chataka</i> (sparrow) fat. |
| 6.  | Milk products                                       | <i>Go dugdha</i> (Cow milk), <i>Aja dugdha</i> (Goat milk), <i>Mahisha Dugdha</i> (Buffalo milk), <i>Go-Ghee</i> (cow ghee), <i>Takra</i> (Fresh buttermilk), and <i>Navneeta</i> (fresh butter derived from Cow milk curd).       | <i>Dadhi</i> (Curd), <i>Avika Dugdha</i> (Sheep milk), and <i>Aavika Ghrita</i> (Sheep ghee).                                |
| 7.  | Spices  | <i>Hingu</i> (feotida), <i>Maricha</i> (pepper), <i>Shunti</i> (dry zinger), <i>Rasona</i> (garlic), <i>Haridra</i> (turmeric), <i>Jeeraka</i> (cumin), <i>Dhaniya</i> (coriander) and <i>Pippali</i> (long Pepper).               | ---  |
| 8.  | Salt  | <i>Saindhava Lavana</i> (rock salt).   | ---  |
| 9.  | Dry fruits  | <i>Kharjur</i> (dried dates) and <i>Mridvika</i> (raisins).  | Cashew nut, Almond and <i>Pista</i> .  |
| 10. | Alcohol   | <i>Purana Madya</i> (Old wine).  |  |
| 11. | <i>Ikshu Varga</i>                                  | <i>Guda</i> , <i>Sharkara</i> , <i>Madhu</i>   | <i>Phanita</i> (treacle)   |
| 12. | <i>Aharayogina Varga</i>                            | <i>Tila Taila</i> (Sesame oil).  | ---  |
| 13. | <i>Kritanna Varga</i> (cooked food) <sup>[28]</sup> | <i>Manda</i> - filtered part after cocking by one part of rice and fourteen parts of water.  | Dried or frozen or fried or spicy food or heavy foods.   |
|     |   | <i>Peya</i> - cocking by one part of rice and fourteen parts of water.   |  |
|     |   | <i>Vilepi</i> - cocking by one part of rice and four parts of water.   |  |
|     |   | <i>Yavagu</i> - cocking by one part of grain rice and six parts of water.  |  |
| 14. | <i>Drinks</i>                                       | Warm water.<br>Decoction made with <i>Tulasi</i> (basil), <i>Dalchini</i> (cinnamon), <i>Marich</i> (black pepper), <i>Shunthi</i> (dry ginger) and <i>Munnaka</i> (dry grapes).<br>Milk processed with <i>Haridra</i> (turmeric). | Frizzed cold water and cool drinks etc.  |

### Viharam (life styles)

*Viharam* is one of the most important pillars in Ayurveda to maintain good health as well as to cure diseases and it gives the understanding about the social relations, behaviors, entertainment and code of dressing etc. It mainly includes *Dinacharya* (day regimen), *Ritucharya* (seasonal regimen) and *Sadvritta* (code of conducts) etc.

In the relation to COVID-19 pandemic condition some of the selective day regimens<sup>[29]</sup> can be followed as mentioned below:

***Nasya, Dhumapana, Gandusha and Anjana:*** The nostrils, mouth and eyes are the main gateways for microbes in to the body and it can be arrested at this

level with *Nasya, Dhumapana, Gandusha* (gargling) and *Anjana* by practicing regularly. These procedures may help to maintain the hygiene as well as healthy mucosal membrane of the respective sites. In COVID-19, these are more useful directly in prevention and spread of the disease and also methods of these procedures explained in Table-6.

***Vyayama, Abhyanga, Snana and Vastra Dharana:*** *Vyayama* (exercise) should be practiced by every individual at their strength/capacity. The *Abhyanga* (oil massage) for at least 5 to 10 minutes by luke warm *Tila Taila* (Sesame oil) or *Bala Taila* or *Ksheera Bala Taila*. Doing regularly *Snana* (bathing) with lukewarm water by mixing with *Neem* leaves

decoction and *Vastra Dharana* (dressing) by changing of the cloths every day or after coming from outside. Practicing of these procedures regularly have various effects on the body. In COVID-19, these are more useful indirectly in prevention of the disease.

**Tambul Sevana:** Chewing of Betel leaf, areca nut with little catechu and lime after meals improves the appetite and digestion. However the phytochemical contents of betel leaf shown potential antiviral effects, thus it may useful in the COVID-19 in prevention or in other aspects of disease.

**Jala Sevana:** Drinking of boiled hot water specifically advised for improving digestion and appetite and also alleviates thirst with little quantity in the fevers<sup>[30]</sup>. In COVID-19 disease, frequently drinking of hot water by little sips, it may be useful to improve

the appetite and digestion as well as alleviate the toxins released by the virus.

### **Sadvritta (Code of Conducts)**

*Sadvritta* means to follow good code of conducts or behavior. It helps to attain two main objectives, which are *Arogyam* (health) and *Indriya Vijaya* (controlling the senses)<sup>[31]</sup>. In this regard, the important traits of code of conducts can be practiced are detailed in the Table-3<sup>[32-33]</sup>. Further, *Achara Rasayana*, which includes various moral conduct and behaviors helps in the rejuvenation of a person<sup>[34]</sup>. These codes of conducts are more helpful, if a person follow before manifestation of the disease<sup>[35]</sup>. The *Sadvritta* may have great role in maintaining the good social relations and improves the strength and immunity which is important factor in controlling COVID-19 like pandemics.

**Table 3: Showing the various *Sadvrittas* and its practices**

| S.No. | Name of the activity   | Practices  |
|-------|--|--|
| 1     | <i>Vyavaharika Sadvritta</i> (behavioral code of conduct)            | It includes speaking truth, not to harm anyone, self-control and speaking pleasantly etc.  |
| 2     | <i>Sharirika Sadvritta</i> (physical code of conduct)                | Following the <i>Dinacharya</i> and <i>Ritucharya</i> .  |
| 3     | <i>Manasika Sadvritta</i> (code of conduct related to mind)          | It includes self-control over mind, speech, thoughts, initiating conversations and avoiding indulging in bad activities etc.   |
| 4     | <i>Samajika Sadvritta</i> (social code of conduct)                   | In relation to the COVID-19, washing the hands, wearing the mask and following the dress code. Further, spread of this pandemics can be reduced by avoiding following activities: <ul style="list-style-type: none"> <li>• Physical and social contact.</li> <li>• Eating together, sharing bed, clothes, ornaments as well as cosmetic products.</li> </ul> |
| 5     | <i>Adhyatamika Sadvritta</i> (spiritual code of conduct)             | Reading the spiritual books, accompanying with wise people etc.  |
| 6     | <i>Ahara Sambandhita Sadvritta</i> (code of conduct related to food) | Following the proper dietary guidelines.   |

### **Oushadham (medicines)**

In pandemics controlling/managing of the disease is very difficult and prevention is best method, which can be achieved by administration of *Rasayana* and acts as immune-modulators. It is one of the main treatment principles in *Janapadodwamsa*<sup>[36]</sup>. The *Rasayanas* can be used regularly in COVID-19 pandemic includes *Chyavanprash*, *Amlaki Rasayana*, *Kushmanda Rasayana*, *Agastya Haritaki*, *Chitraka Haritaki*, and *Ardhraka Khanda* etc and specifically used in *Shwasa* and *Kasa* diseases. Therefore, in COVID-19 pandemic, regular administration of these *Rasayanas* will help in enhancing the immunity and these may be administered daily morning with milk except *Amlaki Rasayana*.

Further, some of the common drugs/herbs, which used regularly in food are indicated in *Jwara*, *Kasa* and *Shwasa* and also having the antiviral effects. These can be administered regularly similar to *Rasayanas* in COVID-19 as mentioned below:

- **Haridra (turmeric):** It is used in various food preparations regularly, indicated in common cold and also in the other diseases. The recent preclinical studies showing potential effect in various viral diseases<sup>[37]</sup>. Further, curcumin bioavailability may be increased in ingested foods as a result of cooking or dissolution in oil or milk.
- **Tulasi (holy Basil)<sup>[38]</sup>, Ardrak (ginger)<sup>[39]</sup> and Nagaveli (betel leaf):<sup>[40]</sup>** These are commonly used in food preparations and upper respiratory

infections. The recent preclinical studies also shows various benefits like immune-modular and antiviral effect. The *Swarasa* (leaves extracted juice) along with honey should be administered.

- **Yastimadhu (licorice):**<sup>[44]</sup> This drug commonly used for throat and respiratory problems. The recent studies shown antiviral effects.
- **Pippali (long pepper):** This drug is one of the most potent drugs used for respiratory ailments in Ayurveda. Its decoction is indicated in fever<sup>[42]</sup>. It is also a *Rasayana* and shows antiviral effect<sup>[43]</sup>.
- **Guduchi (giloy):** This one of the potent drug commonly used for all fevers it was advised alone in the form of *Swarasa* (juice) or decoction with the combination of *Pippali*<sup>[44]</sup>. It has shown as antipyretic and immune-modular effects in recent studies<sup>[45]</sup>.
- **Lasuna (garlic):** This is commonly used in foods. It is indicated in various diseases including *Jwara* and should be consumed in the morning either with Ghee or milk<sup>[46]</sup>. The recent pre-clinical study

proved to be effective in the infectious bronchitis virus (IBV) which is one type of Corona viruses<sup>[47]</sup>.

In the vulnerable people like Quarantine (suspected for COVID-19 infection) or diabetic or hypertensive or old age people and health care professionals as well as other related staff, are more prone to get infected. Therefore, for these people administration of some medicines like *Sanjeevini vati*, *Tapyadi loham* and *Shamshamani vati* etc, as mentioned in Table-8 will be more helpful in an optimum dose along with any *Rasayana* and other preventive measures.

#### **Panchakarma and other related procedures**

The administration of *Panchakarmas* (body cleansing procedures) is indicated in the pandemic conditions<sup>[36]</sup>. These procedures may acts as preventive, curative and rejuvenative by removing the accumulated *Doshas* (endo-toxins) in the healthy and diseased people. In this regard some of the procedures are described in the Table-5.

**Table 5: Showing Panchakarma and other procedures**

| S.No | Name of the Procedure                                 | Method and benefits   |
|------|---|---|
| 1    | <i>Mrudu Rechana</i> (mild purgation) <sup>[48]</sup> | This can be done by <i>Triphala Churna</i> 5gms with luke warm water at the time of bed after ½ hour of the food. This is one type of <i>Mrudu Shodhana</i> (mild cleansing procedure) helps in removing the all toxins, improves appetite and digestion as well as facilitate for better effects of <i>Rasayanas</i> .   |
| 2    | <i>Nasya</i> <sup>[49]</sup>                          | Putting 2 drops of <i>Goghrita</i> (ghee) or <i>Tila taila</i> or medicated oil like <i>Anu taila</i> in each nostril in the morning with the empty stomach. It may be useful in protection of nasal mucosal membrane and for the better filtration of the air as it may not allow entry of dust as well as micro-organisms.  |
| 3    | <i>Anjana</i> <sup>[49]</sup>                         | It is a medicated ointment (collyrium) is applied to the inner part of the lower eye lid from inner to outer canthus by fingertip or specialized stick. Contraindicated in <i>Taruna Jwara</i> (starting 7 days fever).   |
| 4    | <i>Dhumapana</i> (Medicated smoking) <sup>[50]</sup>  | It can be done daily with <i>Haridra</i> , <i>Tamal patra</i> (malbar leaf, tejpan), <i>Javv</i> , (Bishops weed) / <i>Dashmool Churna</i> <sup>[51]</sup> .  |
| 5    | <i>Gandush</i> (oil/decoction pulling)                | Pulling of the mouth either by salted Turmeric decoction or luke warm water mixed with a pinch of clove powder or <i>Irimedadi taila</i> or <i>Tila taila</i> (sesame oil) mixed with a pinch of clove powder. It can be continued till sweat appears over the face (more or less 5minutes).  |
| 6    | <i>Nishthivan</i> (spitting) <sup>[49]</sup>          | It is done by 20ml Ginger juice mixed with 1gm rock salt and 3gm <i>Trikatu</i> powder and holding in the mouth and then spitting out slowly. This is one type of <i>Gandusha</i> , but holding time may be very few seconds (20 to 30 seconds) and helps in get relief of <i>Kapha</i> (may be cleansing of the oral mucosa) and useful in <i>Sannipataj Jwara</i> . |

The above mentioned all *Panchakarmas* and other related procedures can be selectively administered as mentioned in the Table- 6.

**Table 6: Showing the indications of Panchakarmas and other procedures in various stages of COVID-19**

| S. No | Name of the Panchakarma | Healthy | Quarantine & Health Workers | Contact / COVID + Mild | COVID + Moderate | COVID + Severe and Critical |
|-------|-------------------------|---------|-----------------------------|------------------------|------------------|-----------------------------|
| 1     | <i>Mrudu Rechana</i>    | √       | √                           | ×                      | ×                | ×                           |
| 2     | <i>Nasya</i>            | √       | √                           | √                      | ×                | ×                           |
| 3     | <i>Anjan</i>            | √       | √                           | ×                      | √                | ×                           |
| 4     | <i>Dhoompaan</i>        | √       | √                           | √                      | √                | ×                           |
| 5     | <i>Dhoopana</i>         | √       | √                           | √                      | √                | ×                           |
| 6     | <i>Gandusha</i>         | √       | √                           | √                      | √                | ×                           |
| 7     | <i>Nishthivana</i>      | ×       | √                           | √                      | √                | ×                           |

**Ayurveda intervention for COVID-19 patients based on the stage/severity of the disease**

Ayurvedic intervention can play important role in the management of COVID-19 especially up to moderate stage and also helpful in restricting the advancement of the disease. Further, it may have the complementary role in severe and critical stage of disease.

Fever present in the mild stage of COVID-19 infection may be considered as *Taruna Jwara*<sup>[52]</sup>. In *Taruna Jwara*, mild vitiated *Doshas* can be treated with *Langhana* (fasting), *Swedana* (fomentation), *Kala* (waiting period of eight days), *Yavagu* (medicated gruels) as well as *Tikta rasa* drugs (drugs having bitter taste) for *Ama pachana* (alleviating the toxins)<sup>[53]</sup>. In *Jwara*, *Langhana* is one of the important procedures and it may be considered as *Upavasa* (controlled and regularized easily digestible food) which is one among the ten methods to attain the lightness of the body<sup>[54]</sup>. Further, *Jwara* gets subsided by *Langhana* as it normalizes the *Dosha*, stimulates the *Agni* (digestion), and the body becomes light as well as restoration of normal appetite<sup>[55]</sup>. These principles can be used selectively like *Langhana- Pathya*, *Langhana - Pachana* and *Shodhana* in the mild, moderate and severe vitiated conditions of *Doshas* respectively<sup>[56]</sup>. The *Langhana* and *Pachana* are many times drug less procedures and can be achieved successfully with proper *Ahara* and *Vihara* as mentioned in the Table-7.

**Table 7: Showing indicated Ahara and Vihara in mild stage of COVID-19**

| S.No | Name of the Method | Remarks  |
|------|--------------------|--|
| 1.   | <i>Ahara</i>       | Should eat light & easily digestible food and should not be in empty stomach <sup>[57]</sup> . All the indicated foods can be taken as mentioned in the Table-2 and <i>Manda</i> , <i>Peyi</i> , <i>Velapi</i> and <i>Yavagu</i> form of cooked foods are more beneficial. |
| 2    | <i>Vihara</i>      | In <i>Dinacharya</i> , all the activities can be performed except oil Massage, exercise and bath as mentioned in the Table- 3.<br>In <i>Sadvritta</i> all the activities can be performed as mentioned in the Table-4.   |
| 3    | <i>Panchakarma</i> | It can be used according to need as mentioned in the Table-8.  |

Further, the administration of the medicines cannot be generalized as in the mild stage the severity of the symptoms like fever, nasal congestion, malaise, headache, muscle pain, cough, sore throat and involvement of GIT with diarrhea and vomiting may differ in the patients. Therefore, drug management should be selective according to dominant *Dosha* and *Lakshana* (symptoms) as mentioned in the below Table-8. The drug doses described in following Tables are generalized and indicative; however, the doses can be modified by the Ayurveda Physician as per the specific conditions.



**Table 8: Showing advisable drugs in mild stage of COVID-19 (Selected from Bhaisajaya Ratnawali and Ayurvedic Formulary of India)**

| Name of drug                 | Administration |       | Vehicle for drug                                     | Dose of drug | Duration of administration |      |       |
|------------------------------|----------------|-------|--|--------------|----------------------------|------|-------|
|                              | Mode           | Route |  |              | Time                       |      | BF/AF |
|                              |                |       |  |              | Days                       | time |       |
| <i>Tribhuvanakirti Rasa</i>  | Tablet         | Oral  | <i>Ardhrak</i> or<br><i>Tulasi</i><br><i>Swarasa</i> | 125mg        | 15-21                      | TID  | AF    |
| <i>Laxmivilasa Rasa</i>      | Tablet         | Oral  | Honey  | 125mg        | 15-21                      | TID  | AF    |
| <i>Shetamshu Rasa</i>        | Tablet         | Oral  | Honey  | 65mg         | 15-21                      | TID  | AF    |
| <i>Sanjeevini Vati</i>       | Tablet         | Oral  | Honey  | 125mg        | 15-21                      | TID  | AF    |
| <i>Sudarshana Ghana Vati</i> | Tablet         | Oral  | Water  | 250mg        | 15-21                      | TID  | BF    |
| <i>Shamshamana Vati</i>      | Tablet         | Oral  | Water  | 125mg        | 15-21                      | TID  | BF    |
| <i>Godanti Bhasma</i>        | Bhasma         | Oral  | Honey  | 125mg        | 15-21                      | TID  | BF    |
| <i>Sitophaladi Churna</i>    | Powder         | Oral  | Honey  | 3gms         | 15-21                      | TID  | BF    |
| <i>Talisadi Churna</i>       | Powder         | Oral  | Honey  | 3gms         | 15-21                      | TID  | BF    |
| <i>Yastimadhu Churna</i>     | Powder         | Oral  | Honey  | 3gms         | 15-21                      | TID  | BF    |

In moderate to severe stage of COVID-19 shows signs of Pneumonia. The same condition is also seen in *Vatakapha Sannipata Jwara*, as it gets complicated with *Swasa Roga* in progress of disease. Therefore, treatment principles of *Swasa Roga* is also very much needed in this stage. Further, in moderate to severe stage the role of Ayurvedic interventions may be beneficial. However, the role of these interventions may be limited or complementary to the other contemporary therapies, if the patient is under intensive care treatment in the moderate or severe stage. The drugs as mentioned in the below Table-9 may be used in different combinations along with drugs mentioned in above Table-8.

**Table 9: Showing specific advisable drugs in moderate to severe stage of COVID-19 (Selected from Bhaisajaya Ratnawali and Ayurvedic Formulary of India)**

| Name of drug                     | Administration |       | Vehicle for drug | Drug dose   | Duration of administration |      |       |
|----------------------------------|----------------|-------|------------------|-------------|----------------------------|------|-------|
|                                  | Mode           | Route |                  |             | Time                       |      | BF/AF |
|                                  |                |       |                  |             | Days                       | time |       |
| <i>Mahalaxmivilasa Rasa</i>      | Tablet         | Oral  | Honey            | 125mg       | 15-21                      | TID  | AF    |
| <i>Malla Sindhuram</i>           | Bhasma         | Oral  | Honey            | 30 to 65 mg | 07-15                      | BID  | AF    |
| <i>Swasakasa Chintamani Rasa</i> | Tablet         | Oral  | Honey            | 65mg        | 15-21                      | TID  | AF    |

Further, various drugs like *Kaphakuthara Rasa*, *Anandabhairav Rasa*, *Sutasekhar Rasa*, *Rajamruganka Ras*, *Swarnabhasma*, *Abhrakabhasma*, *Mahajwarankusa Rasa*, *Sannipata Bhirava Rasa*, *Vettumara Gutika*, *Bharangyadi Churna*, *Tankana Bhasma* and *Lavangadi Vati* etc, can also be used in the above mentioned method in different combinations from mild to severe stage.

The methods like *Ahara*, *Vihara* and *Panchakarmas* in the moderate stage and only *Ahara Vidhi* in severe stage, can be adopted as mentioned in the Table -6 & 7.

In critical stage of COVID-19, the patient will be under intensive care and role of Ayurveda management may be limited. However the gold preparations like *Swarnabhasma*, *Mahalaxmivilasa Rasa*, *Swasakasachintamani Rasa* and *Hemagharbha pottali Rasa* can be administered by monitoring Hepato-renal functions. These gold preparation drugs may help for good recovery of the patient by reducing the infection, nullifying the toxicity of drugs and improves the immunity.

In children, the single and compound drugs mentioned under *Rasayana* therapy and various



stages of COVID-19 management may also be used with customized doses as per the age of the child. Apart from these, drugs that can be used especially in children included *Kumarkalyana Rasa*, *Balarogantak Rasa*, *Balcharturbhara Churna* and *Aravindaasav*.

### **Ayurvedic intervention for recovered patients and prevention of the recurrence**

In recovered patients of COVID-19, the infection may be relapsed due to various factors like loss of immunity, using of immunosuppressant drugs for previous disease and mutation of the same virus. The strong immunity helps in preventing the recurrence of the infection and *Rasayanas* plays important role at this condition. Further in the recovered patients the digestive, respiratory, renal and hemopoietic functions should be taken care properly as these systems are more involved in this infection. Therefore, it is important to follow all preventive measures including daily regimens, *Ahara*, *Vihara* and *Sadvritta* during the follow up period and thereafter. The selective drugs and *Rasayanas* like *Punarnava*, *Mandura*, *Pravalpanchmruta*, *Shamshamani Vati*, *Chavyanaprasha*, *Avalehya* and *Kushmanda Rasayana* can be advised.

### **DISCUSSION**

The Pandemic/epidemic conditions are described in Ayurveda under *Janapadodwamsa*. The current COVID-19 pandemic is due to viral infection. *Acharyas* told that invasion of *Bhuta* leads to death of the people in large number. In present context, the term of *Bhuta* can be understood as microbes (virus/bacteria). In pandemics, *Adharma* (sinful acts/unethical practices) is basic cause, which includes improperly following the all *Aharas* and *Vihars* (food habits and life styles mentioned above) leads to disturbing the balance of biological, ecological, physical, social and economic conditions. In Ayurveda, manifestation of pandemics can be understood in a vitiating cycle. Initially *Adharma* is basic factor and then it may be triggered by invasion of the *Bhutas*, thereby vitiating all four factors (air, water, place and time) along with loss of *Bala* (strength) as well as *Ojas* (immunity) and results in to epidemic/Pandemics. Accordingly, to break the cycle of pandemics, *Acharyas* explanations can be understood in a phased manner and same may be practiced in all pandemic infections. However, the scientific world has pinned more about the causative organism and its management to overcome the situations arising time to time. Though, it is not proving absolute solution in present scenario, since it is unable to prevent from the occurrence of other type of pandemics in the future.

Therefore, the guidelines should be holistic in the management of pandemics. In COVID-19, the

physical and social contact, contaminated air (with droplet infection) and place (hotspot areas with cluster of infected patients) are main source of transmission of infection, which can be corrected by social distancing, *Dhupana* (fumigation) and *Parisheka* (sprinkling of medicated water) respectively. These can be performed by simple procedures with available drugs (mentioned above) and also there is need to develop the method technically for covering larger areas to avoid community spreading.

In Ayurveda, food has been called as *Mahaoushadhi* (it is above to all medicines) and the practice of good food habits (*Ahara Vidhi*) is important to maintain vitality and strength of the body. Further, adopting proper *Viharas* in the form of *Dinacharya* and *Sadvritta* for good physical and spiritual as well as social relations for building healthy individual and community. Moreover, it reduces the stress to patients during quarantine period. In prevention of COVID-19, physical and social distancing is very important, which are the parts of *Sadvritta*. Therefore, it is very important to do regular practice of forgotten good daily regimens, which will help in prevention as well as resistance from the suffering in ongoing pandemics.

In COVID-19 management, good immunity is important factor for arresting or preventing the disease, which can be achieved by regular administration of *Rasayanas*. Further, some of the *Rasayana* drugs like *Guduchi* and *Pippali* etc. are proved to be having antiviral effect and may have its direct role in diseased condition.

In COVID-19, the infected patients may be managed based on *Jwara* treatment principles and associated symptoms in mild stage. In moderate to severe stage, *Swasa* treatment principles can be adopted as per the requirement. In this regard, *Acharyas* enlightened various drugs based on cause, disease (stage/severity etc.), patient's status, social, economic and regional availability of drugs etc. Accordingly, one drug for many diseases viz. therefore administration of a single formulation may not show similar efficacy in all patients. Further, it was mentioned that quantity of the food and dose of the drug cannot be standardized uniformly for all patients and it should be assessed as per vitiation of *Doshas*, digestive capacity, strength, age, disease and digestion<sup>[58]</sup>. Therefore, the mentioned drugs/*Rasayanas* have to be used as per the specific situation. In the moderate to severe stage of disease, administration of Arsenic preparations like *Mallasindhuram* or *Rasamanikya Rasa* etc. may act potentially in combination of other drugs in this viral infection.

The mineral drugs like *Swarna Bhasma*, *Rajata Bhasma*, *Abhraka Bhasma* and *Pravala Pisti* and their formulations which are described as *Rasayanas* and also indicated in highly infectious as well as contagious diseases. Therefore, the administration of any medicine with the combination of Arsenic or Gold preparations may also useful in acute COVID-19 infections and it is high time to conduct the preclinical / clinical studies on these drugs. These mineral drugs can safely administered by observing the safety and toxicity profiles. The role of Ayurveda intervention is more beneficial in mild to moderate cases and in severe cases, if the patient is not shifted to intensive care in COVID-19. The physician should not treat any COVID-19 infected patient without safety precautions or without informing the local authorities. Further, should follow the guidelines prescribed by WHO, Ministry of Health & family welfare and Ministry of AYUSH time to time for arresting the pandemic COVID-19 infection.

#### CONCLUSION

Immunity is vital factor for good outcome in the management of COVID-19 pandemic condition. The prevention /arrest of pandemic can be achieved by adopting proper food habits and life styles as well as regularly taking the *Rasayanas*. Therefore, creation of awareness is very important among all categories of the people as these basic principles for good health are neglected in modern era. It is need of time to implement these principles in National health policies to make the Nation healthy. Further, numbers of herbo-mineral or mineral drugs mentioned in the classics of *Rasashatra*, which are practiced for various acute infections since ancient time. However, clinical trials need to be conducted on the basis of *Ayurvedic* parameters for generating scientific evidence on safety and efficacy of these drugs in COVID-19 infection for wider acceptance.

#### REFERANCES

1. Coronavirus Disease (Covid-19) Outbreak: Rights, Roles and Responsibilities of Health workers, including Key Considerations for Occupational Safety and Health, accessed on 21.04.2020. Available from: [https://www.who.int/docs/default-source/coronaviruse/who-rights-roles-respon-hw-covid-19.pdf?sfvrsn=bcabd401\\_0](https://www.who.int/docs/default-source/coronaviruse/who-rights-roles-respon-hw-covid-19.pdf?sfvrsn=bcabd401_0)
2. COVID-19 INDIA as on: 21 April 2020, 08:00 GMT+5:30, Available from: <https://www.mohfw.gov.in>
3. Shri. Satya Narayana Sastri, with Vidyotini Hindi Commentary, Agnivesha's Charakasamhita, Part-I, Varanasi, Chowkhamba Bharati Academy, 2005, p.692-693.

4. Shri. Satya Narayana Sastri, with Vidyotini Hindi Commentary, Agnivesha's Charakasamhita, Part-I, Varanasi, Chowkhamba Bharati Academy, 2005, p.694.
5. Shri. Satya Narayana Sastri, with Vidyotini Hindi Commentary, Agnivesha's Charakasamhita, Part-I, Varanasi, Chowkhamba Bharati Academy, 2005, p.695.
6. Shri. Satya Narayana Sastri, with Vidyotini Hindi Commentary, Agnivesha's Charakasamhita, Part-I, Varanasi, Chowkhamba Bharati Academy, 2005, p.696.
7. Vaidya Yadavji Trikamji Acharya Chakrapnitika, Charaka samhita, Varanasi, Chowkhamba Prakash, 2010, p.240.
8. Kaviraj Ambikadutta Shastri, with Ayurveda-Tattva-Sandipika Hindi Commentary, Sushruta's Sushrutasamhita, Part-I Varanasi, Chowkhamba Sanskrit Sansthan, 2007, p.22.
9. Kaviraj Ambikadutta Shastri, with Ayurveda-Tattva-Sandipika Hindi Commentary, Sushruta's Sushrutasamhita, Part-I, Varanasi, Chowkhamba Sanskrit Sansthan, 2007, p.22.
10. Kaviraj Ambikadutta Shastri, with Ayurveda-Tattva-Sandipika Hindi Commentary, Sushruta's Sushrutasamhita, Part-I, Varanasi, Chowkhamba Sanskrit Sansthan, 2007, p.101.
11. Kaviraj Ambikadutta Shastri, with Ayurveda-Tattva-Sandipika Hindi Commentary, Sushruta's Sushrutasamhita, Part-I, Varanasi, Chowkhamba Sanskrit Sansthan, 2007, p.251.
12. Vaidya Yadavji Trikamji, with Acharya Chakrapnitika, Charaka samhita, Varanasi, Chowkhamba Prakash, 2010, p.613-614.
13. Shri. Satya Narayana Sastri, with Vidyotini Hindi Commentary, Agnivesha's Charakasamhita, Part-II, Varanasi, Chowkhamba Bharati Academy, 2006, p.118.
14. Shri. Harihar Prasad Pandey, Bhavaprakasha, with Vidyotani Hindi Commentary, Varanasi, Choukhamba Sanskrit Pustakalaya, 1941, p.58.
15. Factsheet for health professionals on Corona viruses, accessed on 21.04.2020. Available from <https://www.ecdc.europa.eu/en/factsheet-health-professionals-coronaviruses>.
16. Laboratory testing for coronavirus disease 2019 (COVID-19) in suspected human cases, accessed on 21.04.2020 from <https://apps.who.int/iris/bitstream/handle/10665/331329/WHO-COVID-19-laboratory-2020.4-eng.pdf?sequence=1&isAllowed=y>.
17. Features, Evaluation and Treatment Coronavirus (COVID-19), accessed on 21.04.2020 from

- [https://www.statpearls.com/kb/viewarticle/52171?utm\\_source=pubmed](https://www.statpearls.com/kb/viewarticle/52171?utm_source=pubmed).
18. Kaviraj Ambikadutta Shastri, with Ayurveda-Tattva-Sandipika Hindi Commentary, Sushruta's Sushrutasamhita, Part-I, Varanasi, Chowkhamba Sanskrit Sansthan, 2007, p.22.
  19. Kaviraj Ambikadutta Shastri, with Ayurveda-Tattva-Sandipika Hindi Commentary, Sushruta's Sushrutasamhita, Part-I, Varanasi, Chowkhamba Sanskrit Sansthan, 2007, p.18.
  20. Professor K. R. Shrikantha Murthy, translated in English, Ashtangasangraha, Part-III, Varanasi, Chowkhamba Orientalia, 2005, p.12.
  21. Shri. Satya Narayana Sastri, with Vidyotini Hindi Commentary, Agnivesha's Charakasamhita, Part-I, Varanasi, Chowkhamba Bharati Academy, 2005, p.227.
  22. Tewari P V, English Commentary, Kashyap Samhita, Varanasi, Chaukhamba Visvabharati, 2013, p.483.
  23. Tewari P V, English Commentary, Kashyap Samhita, Varanasi, Chaukhamba Visvabharati, 2013, p.468.
  24. Shri. Satya Narayana Sastri, with Vidyotini Hindi Commentary, Agnivesha's Charakasamhita, Part-I, Varanasi, Chowkhamba Bharati Academy, 2005, p.463.
  25. Shri. Satya Narayana Sastri, with Vidyotini Hindi Commentary, Agnivesha's Charakasamhita, Part-I, Varanasi, Chowkhamba Bharati Academy, 2005, p.570, 568.
  26. Shri. Satya Narayana Sastri, with Vidyotini Hindi Commentary, Agnivesha's Charakasamhita, Part-I, Varanasi, Chowkhamba Bharati Academy, 2005, p.683.
  27. Shri. Satya Narayana Sastri, with Vidyotini Hindi Commentary, Agnivesha's Charakasamhita, Part-I, Varanasi, Chowkhamba Bharati Academy, 2005, p.466.
  28. Shri. Brahmananda Tripathi, with Dipika Hindi Commentary, Sharangadara's Sharangadhara Samhita, Varanasi, Chaukhambha Surabhabharati, 2015, p.104, 106.
  29. Professor K. R. Shrikantha Murthy, translated in English, Ashtangasangraha, Part-I, Varanasi, Chowkhamba Orientalia, 2005, p.31-38.
  30. Shri. Satya Narayana Sastri, with Vidyotini Hindi Commentary, Agnivesha's Charakasamhita, Part-I, Varanasi, Chowkhamba Bharati Academy, 2005, p.701.
  31. Shri. Satya Narayana Sastri, with Vidyotini Hindi commentary, Agnivesha's Charakasamhita, Part-I, Varanasi, Chowkhamba Bharati Academy, 2005, p.181.
  32. Shri. Satya Narayana Sastri, with Vidyotini Hindi commentary, Agnivesha's Charakasamhita, Part-I, Varanasi, Chowkhamba Bharati Academy, 2005, p.182-184.
  33. Kavita E. Kamble, Kalpana K. Jadhav, Sadvritta: For the Stress Management, Ayurved Darpana Journal of Indian Medicine, 2018; Vol. 3 Issue 1.
  34. Shri. Satya Narayana Sastri, with Vidyotini Hindi Commentary, Agnivesha's Charakasamhita, Part-II, Varanasi, Chowkhamba Bharati Academy, 2006, p.58.
  35. Shri. Satya Narayana Sastri, with Vidyotini Hindi Commentary, Agnivesha's Charakasamhita, Part-I, Varanasi, Chowkhamba Bharati Academy, 2005, p.170.
  36. Shri. Satya Narayana Sastri, with Vidyotini Hindi Commentary, Agnivesha's Charakasamhita, Part-I, Varanasi, Chowkhamba Bharati Academy, 2005, p.684.
  37. Dimas Praditya, Lisa Kirchhoff, Janina Brüning, Heni Rachmawati, Joerg Steinmann and Eike Steinmann: Anti-infective Properties of the Golden Spice Curcumin, *Frontiers in Microbiology*, published: 03 May 2019, doi: 10.3389/fmicb.2019.00912.
  38. Bano N, Ahmed A, Tanveer M, Khan GM and Ansari MT: Pharmacological Evaluation of *Ocimum sanctum*, *Journal of Bioequivalence & Bioavailability*, Bano et al., *J Bioequiv Availab* 2017, 9:3DOI: 10.4172/jbb.100.
  39. Rajesh Kumar Mishra, Anil Kumar and Ashok Kumar: Pharmacological Activity of *Zingiber officinale*, *International Journal of Pharmaceutical and Chemical Sciences*, Vol. 1 (3) Jul-Sep 2012.
  40. Vandana Dwivedi, Shalini Tripathi, Review study on potential activity of Piper betle, *Journal of Pharmacognosy and Phytochemistry* 2014; 3(4): 93-98.
  41. Korhalkar Anagha, Deshpande Manasi, Lele Priya and Modak Meera: Scope of *Glycyrrhiza glabra* (Yashtimadhu) as an Antiviral agent: A Review, *International Journal of Current Microbiology and Applied sciences*, *Int.J.Curr.Microbiol. App.Sci*(2014)3(12): 657-665.
  42. Shri. Indra Dev Tripathi, with Vaidyaprabhatika, Hindi Commentary, Chakrapanidatta's Chakradatta, Varanasi, Chaukhambha Sanskrit Bhawan, 2014, p.15.
  43. Priya N. C, P. Saravana Kumari: Antiviral Activities and Cytotoxicity Assay of Seed Extracts of *Piper longum* and *Piper nigrum* on Human Cell Lines, *International Journal of Pharmaceutical*



- Sciences Review and Research, Int. J. Pharm. Sci. Rev. Res., 44(1), May - June 2017; Article No. 42, Pages: 197-202.
44. Shri. Indra Dev Tripathi, with Vaidyaprabhatika, Hindi Commentary, Chakrapanidatta's Chakradatta, Varanasi, Chaukhamba Sanskrit Bhawan, 2014, p.22.
45. Surabhi Singh, Bodhisatta Nandy and Madhu G. Tapadia: Complex effects of Ayurvedic formulation: Guduchi and Madhuyashtion different components of life history may elude the elixir effect, Journal of Genetics, Vol. 97, No. 5, December 2018, pp. 1253-1261.
46. Bhisagratna Shri. Brahmashankar Mishra, Vidyotini, Hindi Commentary Shri. Govind Das of Bhaishajyaratnavali, Varanasi, Chaukhamba Prakashan, 2013, p.100.
47. Tabassom Mohajer Shojai, Arash Ghalyanchi Langeroudi, Vahid Karimi, Abbas Barin, Naser Sadri: The effect of Allium sativum (Garlic) extract on infectious bronchitis virus in specific pathogen free embryonic egg, Avicenna Journal of Phytomedicine, AJP, Vol. 6, No. 4, Jul-Aug 2016.
48. Shri. Indra Dev Tripathi, with Vaidyaprabhatika, Hindi Commentary, Chakrapanidatta's Chakradatta, Varanasi, Chaukhamba Sanskrit Bhawan, 2014, p.29.
49. Shri. Indra Dev Tripathi, with Vaidyaprabhatika, Hindi Commentary, Chakrapanidatta's Chakradatta, Varanasi, Chaukhamba Sanskrit Bhawan, 2014, p.16.
50. Shri. Anantaram Sharma, Sushrita Vimarshani, Hindi Commentary, Sushruta's Sushrutasamhita, Part-II, Varanasi, Chowkhamba Surabharati, 2008, p.430.
51. Shri. Anantaram Sharma, Sushrita Vimarshani, Hindi Commentary, Sushruta's Sushrutasamhita, Part-II, Varanasi, Chowkhamba Surabharati, 2008, p.430.
52. Bhisagratna Shri. Brahmashankar Mishra, Vidyotini, Hindi Commentary Shri. Govind Das of Bhaishajyaratnavali, Varanasi, Chaukhamba Prakashan, 2013, p.71.
53. Shri. Kaviraja Atrideva Gupta, edited with Vidyotini Hindi Commentary, Ashtangahrudayam, Varanasi, Chaukhamba Prakashan, 2008, p. 390,
54. Shri. Satya Narayana Sastri, with Vidyotini Hindi Commentary, Agnivesha's Charakasamhita, Part-I, Varanasi, Chowkhamba Bharati Academy, 2005, p.427.
55. Shri. Satya Narayana Sastri, with Vidyotini Hindi Commentary, Agnivesha's Charakasamhita, Part-II, Varanasi, Chowkhamba Bharati Academy, 2005, p.133-134.
56. Shri. Kaviraja Atrideva Gupta, edited with Vidyotini Hindi Commentary, Vagbhat's Ashtangahrudayam, Varanasi, Chaukhamba Prakashan, 2008, p. 100.
57. Bhisagratna Shri. Brahmashankar Mishra, Vidyotini, Hindi Commentary, Shri. Govind Das, of Bhaishajyaratnavali, Varanasi, Chaukhamba Prakashan, 2013, p.70.
58. Bhisagratna Shri. Brahmashankar Mishra, Vidyotini, Hindi Commentary Shri. Govind Das, of Bhaishajyaratnavali, Varanasi, Chaukhamba Prakashan, 2013, p.73.

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**\*Address for correspondence**

**Dr. U. R. Sekhar Namburi**

Research Officer (Ay.),  
CCRAS, New Delhi

Posted at: Ministry of AYUSH

Email: [shilpasekhar2k5@yahoo.com](mailto:shilpasekhar2k5@yahoo.com)

Mobile: 8055595355

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